

## Timothy Alan Butterfield PhD ATC LAT

### Personal Data

Name: Timothy Alan Butterfield  
Address: Department of Family Medicine  
The Ohio State University Sports Medicine Center  
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E-mail: tim.butterfield@osumc.edu  
Date of birth: November 30, 1964  
Place of birth: Canton, New York  
Citizenship: USA  
Family Status: Married

### Education

Postdoctoral Training Postdoctoral Researcher, College of Medicine (2005 – present)  
Department of Family Medicine  
The Ohio State University  
Supervisor: Thomas Best, MD PhD

Graduate Education University of Calgary (2001-2005)  
Calgary, Alberta, Canada  
PhD, Kinesiology. specialization: biomechanics (2005)  
Supervisor: Walter Herzog, PhD

Old Dominion University (1990-1992)  
Norfolk, Virginia, USA  
MSc, Athletic Training (1992)  
Supervisor: Marty Bradley, MSc ATC

Undergraduate Education: Messiah College (1988-1990)  
Grantham, Pennsylvania, USA  
BS, Sports Medicine (1990)  
Supervisor: Edwin Bush, MSc ATC

State University of New York at Potsdam (1983-1988, 1999)  
Potsdam, New York, USA  
BA, Biology (1999)  
Supervisor: Al Robinson, PhD

## Employment

2005-present	Postdoctoral Researcher, Biomedical Sciences Department of Family Medicine The Ohio State University, Columbus, OH
2005-present	Adjunct Assistant Professor, Athletic Training Program School of Allied Medical Professions The Ohio State University, Columbus, OH
2004	Adjunct Instructor, Department of Community Health State University of New York at Potsdam, Potsdam, NY
2003-2004	Adjunct Clinical Instructor / Supervisor, Athletic Therapy Mount Royal College, Calgary, AB
2002-2005	Graduate Teaching Assistant, Faculty of Kinesiology University of Calgary, Calgary, AB
2001-2003	Athletic Therapist, Sport Therapy Services University of Calgary, Calgary, AB
1999-2001	Clinical Instructor, Department of Physical Therapy School of Health Sciences Clarkson University, Potsdam, NY
1998-2001	Instructor, Department of Community Health School of Education State University of NY at Potsdam, Potsdam, NY
1998-2001	Head Certified Athletic Trainer, Department of Athletics State University of NY at Potsdam, Potsdam, NY
1997-1998	Head Certified Athletic Trainer, Outpatient Physical Therapy Samaritan Medical Center, Watertown, NY
1992-1998	Head Certified Athletic Trainer: Football, Department of Athletics. Mansfield University, Mansfield, PA
1990-1992	Head Certified Athletic Trainer, Department of Athletics Virginia Wesleyan University, Virginia Beach, VA

## Other Professional Activities

1998-1999	Medical Director, Rutgers Soccer School Rutgers University, Piscataway, NJ,
1998	Volunteer Certified Athletic Trainer; speedskating, bobsled, luge. US Olympic Training Center, Lake Placid, NY
1996	Certified Athletic Trainer; Field Hockey Summer Olympic Games, Atlanta, GA
1994-1996	Certified Athletic Trainer; Rutgers Soccer School Rutgers University, Piscataway, NJ
1993	Certified Athletic Trainer; basketball Empire State Games, Rochester, NY
1991-1992	Certified Athletic Trainer; Hampton Roads Admirals ECHL hockey team. Norfolk, VA

### **Professional Affiliations**

2006-present	American Physiological Society
2005-present	American College of Sports Medicine
2001-present	International Society of Biomechanics
2001-present	American Society of Biomechanics
2001-2005	Canadian Society of Biomechanics
1997-present	New York State Athletic Trainers' Association
1992-present	Eastern Athletic Trainers' Association
1988-present	National Athletic Trainers' Association

### **Certifications and Licenses**

2005-present	Ohio Board of Athletic Training, License #002609
2005-present	CRC CPR certification
2000-2003	Emergency Medical Technician (NY)
1998-2002	AHA AED Instructor training
1998-2002	ARC First Aid and CPR Instructor training
1997-present	New York State Dept. of Education, ATC license #000110
1996-2003	Emergency Medical Technician Instructor training (PA)
1990-present	NATABOC certification # 0000030775
1988-2003	Emergency Medical Technician (PA)

### **Honors and Awards**

2006	Research Endowment Award American College of Sports Medicine
2006	Perrin Award for Outstanding Doctoral Dissertation National Athletic Trainers' Association
2005-present	Division of Sports Medicine Postdoctoral Fellowship The Ohio State University
2005	Half Graduate Assistantship in Teaching, Faculty of Kinesiology, University of Calgary
2004	Full Graduate Assistantship in Teaching, Faculty of Kinesiology, University of Calgary
2004	Award for Outstanding Leadership and Contribution University of Calgary Kinesiology Research Centre
2004-2005	Clinician-Scientist Fellowship in Bone and Joint Health, Canadian Institutes of Health Research
2004	Graduate Research Scholarship University of Calgary
2004	Journal of Biomechanics Award, Finalist American Society of Biomechanics

2003-2004	Clinician-Scientist Fellowship in Bone and Joint Health, Canadian Institutes of Health Research
2003	Full Graduate Assistantship in Teaching, Faculty of Kinesiology, University of Calgary
2003	Half Graduate Assistantship in Teaching, Faculty of Kinesiology, University of Calgary Canadian Institutes of Health Research
2002	Bill Robertson Scholarship Northwest Athletic Trainers' Association
2000	Research and Creative Endeavors Grant, Office of Research, State University of New York at Potsdam Potsdam, NY
1990-1992	Graduate Assistantship, Department of Education, Old Dominion University

## **Professional Activities**

### Journal Reviewer

Journal of Applied Physiology  
IEEE Transactions on Rehabilitation Engineering  
Applied Physiology, Nutrition and Metabolism  
Journal of Athletic Training

## **Teaching**

### Graduate Teaching Assistant

“Scientific Basis for the Prevention and Care of Injuries”, laboratory instructor.  
Department of Kinesiology, University of Calgary (2002, 2003, 2005)

“Gross Anatomy”. laboratory Instructor. Department of Kinesiology, University of Calgary (2003, 2004)

### Formal Courses Taught

“Athletic Training Biomechanics”, School of Allied Medicine, Department of Athletic Training, The Ohio State University, Columbus, OH (2007).

“Physiological Aspects of Aging, Disease and Physical Activity”, Department of Community Health, State University of New York at Potsdam (2004)

“Introduction to Sports Medicine”, Department of Community Health, State University of New York at Potsdam (2001, 2000, 1999, 1998)

“Kinesiology”, Department of Community Health, State University of New York at Potsdam (2001, 2000)

“Exercise Physiology”, Department of Community Health, State University of New York at Potsdam (2001, 2000)

“Responding to Emergencies”, Department of Community Health, (2001, 2000, 1999, 1998)

### **Invited Lectures and Symposia**

“The Magnitude of Muscle Strain Does Not Influence Serial Sarcomere Number Adaptations Following Eccentric Exercise.” *Poster Presentation* at the American College of Sports Medicine, 53<sup>rd</sup> Annual Meeting, May 31, 2006. Denver, CO.

“The Interaction of Surface Grade and Exercise Duration for Serial Sarcomere Adaptations Following Treadmill Running in Rats.” *Podium Presentation* at the American Society of Biomechanics and International Society of Biomechanics Combined Conference, August 4, 2005. Cleveland, OH.

“Can an Altered Neuromuscular Coordination Pattern Result in Muscle Strain Injury?.” *Podium Presentation* at the Canadian Athletic Therapists Association 39th Annual Conference, Calgary, AB, Canada: May, 8-25-28, 2005

“Small Changes in the Timing of Activation Affects Fiber Length and Sarcomere Number Adaptations in the Rabbit Tibialis Anterior Exposed to Eccentric Exercise.” *Podium Presentation* at the American Society of Biomechanics, Annual Conference, Portland, OR: September, 8-11, 2004

“Mechanical Properties of Skeletal Muscle”, Clarkson University Department of Physical Therapy, Potsdam, NY. July, 2004

“The Effect of Muscle Activation Timing on Fiber Strain During Eccentric Contractions.” *Podium Presentation* at the Canadian Society of Biomechanics, 13th Biennial Conference, Halifax, NS: August 4-7, 2004.

“Skeletal Muscle Plasticity Following Repetitive Strain Injury”. University of Calgary, Department of Kinesiology, Calgary, AB. May, 2003

“The Adaptive Response of Rabbit Dorsiflexor Muscle to Repetitive Strain Injury.” *Poster Presentation* at the first Annual Alberta Provincial CIHR Conference Proceedings. Banff, AB: October 23-24, 2003

“Sarcomere Number Adaptation in the Rabbit Tibialis Anterior After Chronic Eccentric Exercise. *Podium presentation* at the American Society of Biomechanics Annual Conference.” Toledo, OH: September 25, 2003.

“The Force-length Relationship Shift and Rotation After Injury.” *Podium presentation* at the III Alberta Biomedical Engineering Conference. Banff, AB: November 10, 2002.

“Acute Bout of Eccentric Exercise in the Rabbit TA Shows Concomitant Fiber Length Shortening and a Subsequent Shift in the Force-Length Relationship.” *Poster Presentation* at the IV World Congress of Biomechanics, Calgary, AB. August 4-9, 2002.

“The Effects of Pre-Exercise Ultrasound on Delayed Onset Muscle Soreness.” *Poster Presentation* at SUNY Potsdam Learning and Research Fair. March 2001.

“Management of Sports Injuries.” Athletic Injury Prevention lecture series at Indian River High School, Philadelphia NY: May, 1998.

“Injury Prevention for Athletes.” Keynote Lecture at Lowville Academy's Athlete Education Seminars, Lowville NY: October, 1998.

“Injury Prevention for Baseball Players.” The Tenth Annual Mansfield University Developmental Baseball Clinic, Mansfield PA: February, 1995.

“Injury Prevention for Baseball Players.” The Ninth Annual Mansfield University Developmental Baseball Clinic, Mansfield PA: February, 1994.

“Prevention and Care of Athletic Injuries to Adolescents.” The Ninth Annual Mansfield University Developmental Baseball Clinic, Mansfield PA: February, 1994.

“Injury Prevention for Baseball Players.” The Eighth Annual Mansfield University Developmental Baseball Clinic, Mansfield PA: February, 1993.

“Assessment and Treatment of Spondylolysis and Spondylolisthesis.” *Podium presentation* at the Mid Atlantic Athletic Trainers' Association Annual Convention, Virginia Beach, VA: May, 1991.

## Publications

### Peer-Reviewed Papers

1. Longino D, **Butterfield TA**, Herzog W. Frequency and Length Dependent Effects of Botulinum Toxin-Induced Muscle Weakness. *Journal of Biomechanics*. Mar; 38 (3): 609-613, 2005.
2. **Butterfield, TA**, Herzog W. Is the Force-Length Relationship a Reliable Indicator of Contractile Element Damage Following Eccentric Exercise? *Journal of Biomechanics*. Sept; 38 (9). 1932-1937, 2005.
3. **Butterfield TA**, Herzog W. Quantification of Muscle Fiber Strain During *In-vivo* Repetitive Stretch-Shortening Cycles. *Journal of Applied Physiology*. Aug; 99 (2): 593-602, 2005.
4. **Butterfield TA**, Leonard TR, Herzog W. Differential Serial Sarcomere Number Adaptations in Knee Extensor Muscles of Rats is Contraction Type Dependent. *Journal of Applied Physiology* Oct; 99 (4): 1352-1358, 2005.
5. **Butterfield TA**, Herzog W. The Magnitude of Muscle Strain Does Not Influence Serial Sarcomere Number Adaptations Following Eccentric Exercise. *Pflügers Archiv-European Journal of Physiology* Feb;451(5):688-700, 2006.
6. **Butterfield TA**, Herzog W. Effect of Altering Starting Length and Activation Timing of Muscle on Fiber Strain and Muscle Damage. *Journal of Applied Physiology*.100(5):1489-1498, 2006.
7. **Butterfield TA**, Best TM, Merrick MA. The Dual Role of Neutrophils and Macrophages in Inflammation: A Critical Balance Between Tissue Damage and Repair. *Journal of Athletic Training*. 41(4): 457-465, 2006.
8. **Butterfield TA**, Corr DT, Toumi H, Best TM. Biomechanical Considerations for Therapy Following Skeletal Muscle Immobilization. *Medicine and Science in Sports and Exercise* (in revision)

### Abstracts and Proceedings

1. **Butterfield TA**, Gardner MM. "The Effects of Pre-Exercise Ultrasound on Delayed Onset Muscle Soreness." SUNY Potsdam Learning and Research Fair Publication. March 2001.

2. **Butterfield TA**, Herzog W. "Acute Bout of Eccentric Exercise in the Rabbit TA Shows Concomitant Fiber Length Shortening and a Subsequent Shift in the Force-Length Relationship." IV World Congress of Biomechanics Proceedings CD. Calgary, Alberta: Omnipress; 2002.
3. **Butterfield TA**, Herzog W. "Fiber Strain and Damage During Eccentric Exercise in the Rabbit TA." Third Alberta Biomedical Engineering Conference Proceedings. Banff, Alberta: November 8-10, 2002.
4. **Butterfield TA**, Herzog W. "Sarcomere Number Adaptation in the Rabbit Tibialis Anterior After Chronic Eccentric Exercise." 2003 American Society of Biomechanics Annual Conference.
5. **Butterfield TA**, Herzog W. "Sarcomere Number Adaptation in the Rabbit Tibialis Anterior After Chronic Eccentric Exercise. Proceedings of the 27<sup>th</sup> Annual Meeting of the American Society of Biomechanics. September 24-26, 2003
6. **Butterfield TA**, Herzog W. "The Adaptive Response of Skeletal Muscle to Repetitive Strain Injury." Fourth Alberta Biomedical Engineering Conference Proceedings. Banff, Alberta: October 24-26, 2003.
7. **Butterfield TA**, Herzog W. "The Effect of Muscle Activation Timing on Fiber Strain During Eccentric Contractions." Canadian Society of Biomechanics, 13th Biennial Conference, August 4-7, 2004. Halifax, NS.
8. **Butterfield TA**, Herzog W. "Small Changes in the Timing of Activation Affects Fiber Length and Sarcomere Number Adaptations in the Rabbit Tibialis Anterior Exposed to Eccentric Exercise." American Society of Biomechanics, Annual Conference, September, 8-11, 2004. Portland, OR.
9. **Butterfield TA**, Herzog W. "Can an Altered Neuromuscular Coordination Pattern Result in Muscle Strain Injury?" Canadian Athletic Therapists Association 39th Annual Conference, May, 8-25-28, 2005. Calgary, AB.
10. **Butterfield TA**, Herzog W. "The Interaction of Surface Grade and Exercise Duration for Serial Sarcomere Adaptations Following Treadmill Running in Rats." American Society of Biomechanics and International Society of Biomechanics Combined Conference, August 1-5, 2005. Cleveland, OH.
11. **Butterfield TA**, Herzog W. "The Magnitude of Muscle Strain Does Not Influence Serial Sarcomere Number Adaptations Following Eccentric Exercise." *Medicine and Science in Sports and Exercise*. 38:5 supplement page S262. 2006.

12. **Butterfield TA**, Herzog W. "The Magnitude of Muscle Strain Does Not Influence Serial Sarcomere Number Adaptations Following Eccentric Exercise." *Scandinavian Journal of Medicine and Science in Sports*. June; 16: 215, 2006.

13. **Butterfield TA**, Brown MB, Best TM. "Stretch-Activated Calcium Channels Are Essential for Functional Adaptations Following Repeated Loading in Skeletal Muscle." American College of Sports Medicine, 54<sup>th</sup> Annual Meeting. New Orleans, LA May 30-June 2, 2007 (submitted).

### **Ongoing Research Support**

Butterfield (PI) 6/06-6/07  
Research Endowment  
American College of Sports Medicine  
The Role of Calcium in Exercise Induced Muscle Adaptation.  
*The major goal of this project is to investigate the role of stretch-activated calcium influx and cell damage in muscle adaptation to chronic eccentric exercise.*

### **Completed Research Support**

Butterfield (PI) 9/03-8/04  
Research Fellowship  
Canadian Institutes of Health Research  
Sarcomere Number Following Strain Injury in Skeletal Muscle  
*The major goal of this project was to investigate the temporal effects of repetitive eccentric contractions on the mechanical properties of skeletal muscle, and their influence on muscle damage in-vivo.*

Butterfield (PI) 9/04-8/05  
Research Fellowship  
Canadian Institutes of Health Research  
Sarcomere Number Following Strain Injury in Skeletal Muscle  
*The major goal of this project was to investigate the influence of fiber dynamics, torque production and muscle damage on serial sarcomere number adaptations following chronic exercise in-vivo.*

### **Grants Submitted**

Butterfield (PI) 6/06  
K99 Training Grant  
National Institutes of Health  
Strain and Cell Signaling in Muscle: The Role of Stretch-Activated Channels